STUDY ON INCLUSION OF PROBIOTIC, PREBIOTIC AND ITS COMBINATION IN BROILER DIET AND THEIR EFFECT ON GROWTH PERFORMANCE OF COMMERCIAL BROILERS

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ABSTRACT

Day-old commercial broiler chicks (n = 200) were distributed randomly into 5 dietary treatment groups, *viz.* control (T_1), probiotic in the feed @ 100 g/tonne (T_2), prebiotic in the feed @ 500 g/ tonne of feed (T_3), synbiotic (probiotic + prebiotic) @ 100 g/tonne and 500 g/tonne of feed, respectively (T_4) and synbiotic (probiotic + prebiotic) @ 50 g/tonne and 250 g/tonne of feed (T_5) respectively, and up to 6 weeks of age their performance was evaluated weekly. Results revealed that various feed additives used in the study affected the growth and feed efficiency of chicks significantly ($P < 0.05$). Body weight at the end of starter phase and whole experiment showed that all treatment groups gained significantly ($P<0.05$) higher body weight than control group. Highest body weight at the end of starter phase was observed in T_5 whereas at the end of experiment T_3 recorded highest body weight. The broilers consumed significantly ($P<0.05$) less amount of feed under synbiotic groups than all others. The FCR was better for the broilers under synbiotic supplemented group (T_4) and it was significantly ($P<0.05$) better than all supplemental groups during finisher phase and during overall study.

KEY WORDS: Broiler, Performance, Prebiotic, Probiotic, Synbiotic.

INTRODUCTION

Poultry is one of the fastest growing segments among the component of agricultural sector in India and is growing at 8 to 15 per cent per annum. Feed as a major input item to broiler rearing for being 75 per cent of the production cost, has a vital role in broiler economics. So, it is imperative to give due attention to proper utilization of feed without adversely affecting the growth or production performance of broilers (Kokje, 1999). Antibiotics have been also used to promote growth rate, improve feed conversion ratio (FCR) and reduce mortality in broiler flocks. However, repeated use of antibiotics in poultry diets resulted in severe problems like resistance of pathogen to antibiotics, accumulation of antibiotics residue in their products and environment, imbalance of normal microflora and reduction in beneficial intestinal microflora (Hinton *et al*., 1986 and Barton, 2000). This has led to development of different products to be used as feed additives such as enzymes, probiotics, prebiotics, organic acids, and plant extracts. Hence, the present study was aimed to evaluate the effect of inclusion of probiotic, prebiotic and its combination in commercial broilers' diet on their growth performance.

MATERIALS AND METHODS

Two hundred day-old (n=200) commercial broiler chicks were randomly distributed into five different treatment groups having four replicates in each treatment with 10 chicks in each replicate and they were reared under battery brooder system of cage up to 42 days of age. Feed and water were offered *ad libitum* and standard managemental practices followed. Chicks were weighed individually at the start of experiment and at the end of every week. Feed intake and body weight for the group were recorded weekly and corrected appropriately for mortality to derive weight gain and FCR. Mortality was also recorded daily. First group (T_1) of birds served as a control. Probiotic in the feed of T_2 group was given @ 100 g/tonne of feed during starter phase (0–4 weeks) and finisher phase

(5–6 weeks). Prebiotic in the feed of T_3 group was given @ 500 g/tonne during starter phase and finisher phase. In T_4 group, probiotic was given @ 100 g/tonne and Prebiotic was given @ 500 g/ tonne of feed during starter phase and finisher phase. Whereas, in T_5 group, probiotic was given @ 50 g/tonne and prebiotic was given @ 250 g/tonne of feed during starter phase and finisher phase, i.e. half of the dose than T_4 treatment. The broiler starter (0–28 days) and broiler finisher (29–49 days) feeds for different treatments were prepared as per the guidelines of BIS (1992). The data on various traits were analyzed using CRD (Completely Randomized Design) as per Snedecor and Cochran (1995).

RESULTS AND DISCUSSION

The body weight, feed consumption, feed conversion ratio and mortality of the different groups offered feed additives either singly or in combination in relation to control are presented in Table.

Table: Effect of probiotic, prebiotic and synbiotic on growth performance and feed efficiency of broiler chicks

	Body weight (g/chick)			Feed consumption (g/bird/week)			Feed Conversion Ratio (gF/gG)			Mortality %
	0-28 d	29-42 d	0-42 d	0-28 d	29-42 d	0-42 d	0-28 d	29-42 d	0-42 d	0-42 d
T_1	1000.40^{a}	962.40	1962.80^{a}	1839.62^{d}	2018.17	3857.80^{b}	1.935^{b}	2.097^{b}	2.016^{c}	0
T_2	1064.63^{b}	994.75	2059.38^{b}	1769.27^{c}	1975.82	3745.10^{b}	1.743^{a}	1.984^{b}	1.862^{b}	0
T_3	1086.40^{b}	1016.90	2103.30^{b}	1784.70^{cd}	2008.15	3792.85^{b}	1.722^{a}	1.975^{b}	1.847^{b}	0
T_4	1064.05^{b}	1014.75	2078.80^{b}	1690.00^{b}	1829.52	3519.52^{a}	1.669^{a}	1.808^{a}	1.735^{a}	0
T_5	1104.66^{b}	987.89	2093.74^{b}	1622.10^{a}	1900.37	3522.47^{a}	1.624^{a}	2.026^{b}	1.817^{b}	5

Means within column with different superscript differ significantly (P<0.05).

Growth: Results revealed that at the end of starter phase average body weights of all supplement groups were higher and differed significantly (P<0.05) from control group but did not differ amongst them. The highest body weight at the end of starter phase was observed in T_5 (synbiotic supplemented at half level dose) group which was followed by T_3, T_2, T_4 and T_1 groups. At the end of experimental period, all treatment groups were higher in body weight than control and differed significantly (P<0.05) from control group body weight, but non-significant differences were observed amongst them. At the end of experiment (6th week), the highest body weight was observed in the prebiotic supplemented group (T_3) which was followed by T_5, T_4, T_2 and T_1 groups. Present findings were in accordance with Khaksefidi and Rahimi (2005), Hosamani *et al.* (2006), Shendare *et al.* (2008) and Bozkurt *et al.* (2009).

Feed Consumption: Total feed consumption during the starter phase (0-4 week) was highest in control group (T_1) which was followed by T_3, T_2, T_4 and T_5 group and it was significantly (P<0.05) higher than T_2, T_4 and T_5. The lowest feed consumption was noticed in the synbiotic half level group (T_5) which was significantly (P<0.05) lower than all other treatment groups. There was a non-significant difference between control (T_1) and prebiotic group (T_3) as well as between prebiotic (T_3) and probiotic group (T_2). Total feed consumption during finisher phase (4-6 week) was highest in the control group (T_1) followed by T_3, T_2, T_5 and T_4 group. Feed consumption was not affected significantly by inclusion of probiotic, prebiotic or synbiotic in finisher phase. During entire experimental period (0-6 weeks) highest feed consumption was in the control group (T_1) followed by T_3, T_2, T_5 and T_4 group. Synbiotic group (T_4) was having significantly (P<0.05) lower feed consumption than control (T_1), probiotic (T_2) and prebiotic (T_3) supplemented group, but there was a non-significant difference between different level of synbiotic (T_4 and T_5) groups. Present results

were in accordance with Anjum *et al.* (2005), Shendare *et al.* (2008) and Kathirvelan *et al.* (2012).

Feed Conversion Ratio: During starter phase (0-4 week) synbiotic half level group (T_5) was having significantly (P<0.05) better FCR than control group though there was a non-significant difference between all supplemental groups. The poor FCR was observed in control as compared to supplement groups. During finisher phase (4-6 week) synbiotic group (T_4) was having significantly (P<0.05) better FCR than all other treatments. There was a non-significant difference between T_1, T_2, T_3 and T_5 groups and among all, the poor FCR was observed in T_1, i.e. control group. During entire experiment period (0-6 weeks), synbiotic group (T_4) was having significantly (P<0.05) better FCR than all other treatments. There was a non-significant difference between T_2, T_3 and T_5 group but they all differed significantly from control group. Present study was in accordance with the results of Ramlah and Tan (1995), Anjum *et al.* (2005), Panda *et al.* (2005), Shendare *et al.* (2008) and Amer and Khan (2012).

Mortality: Under the best managemental condition of rearing, the mortality (%) in T_5 group was 5 %, while T_1, T_2, T_3 and T_4 groups recorded no mortality. It was observed that the overall mortality from all the groups was within limits. The liveability of birds for T_1, T_2, T_3, T_4 and T_5 was 100, 100, 100, 100 and 95 per cent, respectively.

CONCLUSION: It can be concluded that inclusion of probiotic, prebiotic and their combination (synbiotic) in broiler diet is beneficial in terms of growth performance as it increases body weight, reduces feed consumption, excelled in feed conversion ratio and reduces mortality percentages in treatment groups as compared to control group. Reduction in feed consumption coupled with increased body weight improved FCR and minimum mortality suggestive of better economics when supplemented with either of probiotic/ prebiotic or their combination.

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